Aug. 10, 1943. E. F. WANNER 2,326,708

HOLLOW BUILDING UNIT FOR STEEL REINFORCED WALLS

Filed April 17, 1940 3 Sheets-Sheet 1

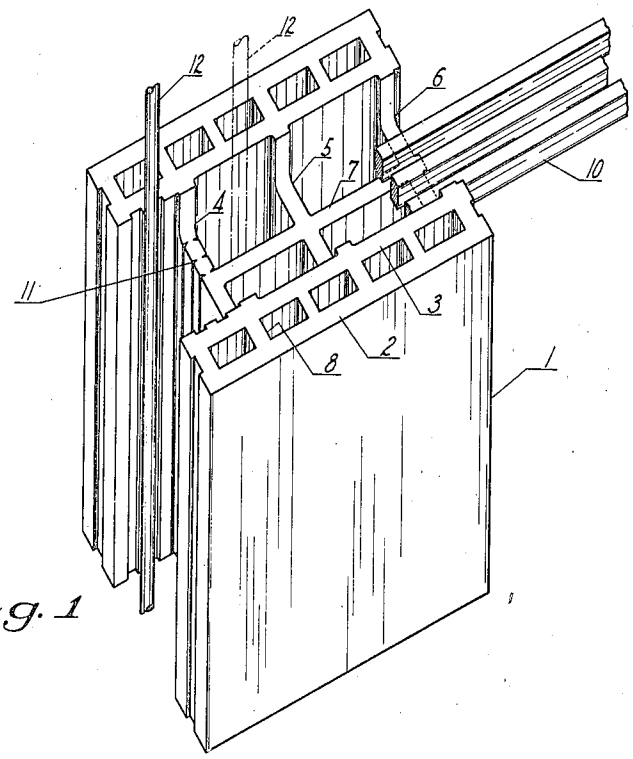


Fig. 1

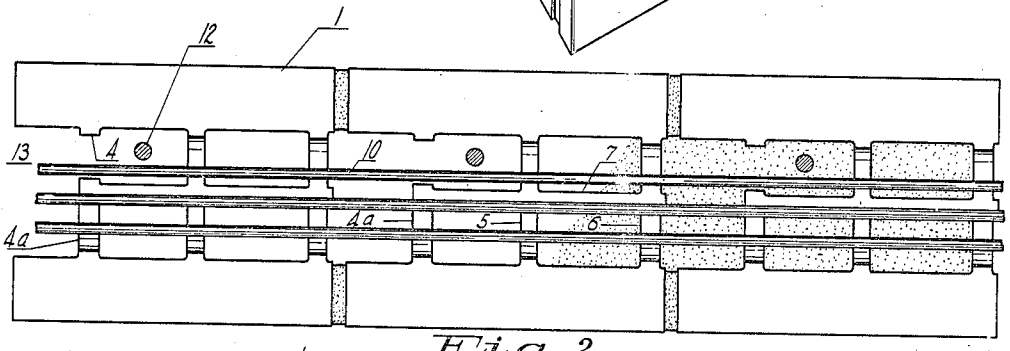


Fig. 2

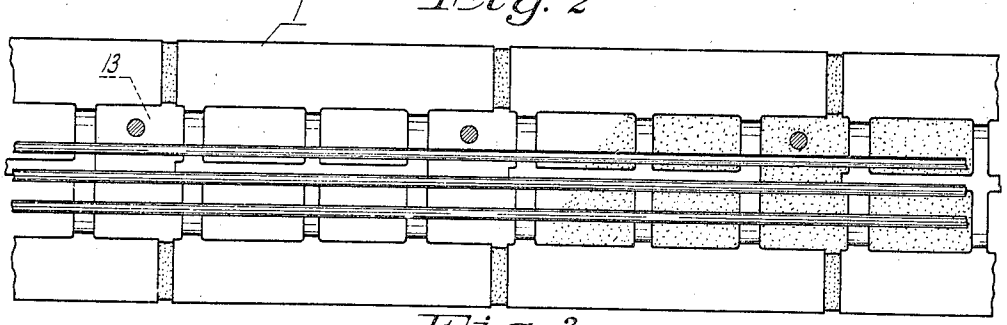


Fig. 3

INVENTOR.

BY Edwin F. Wanner
William B. Jaspert
Attorney.

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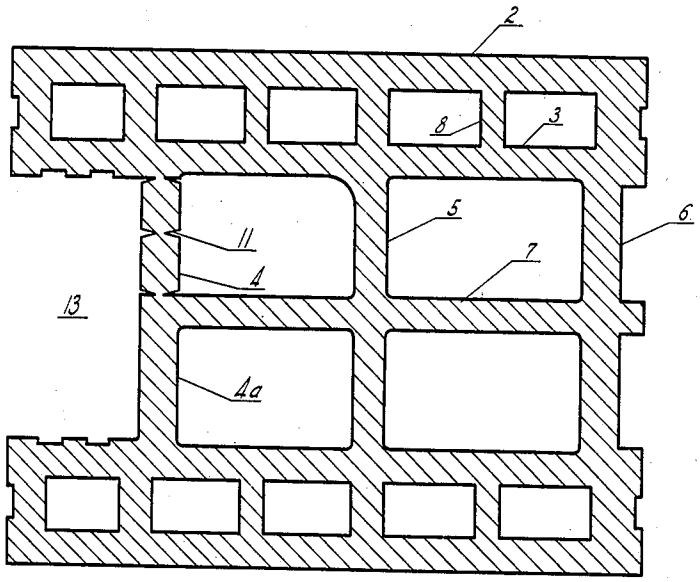


Fig. 4

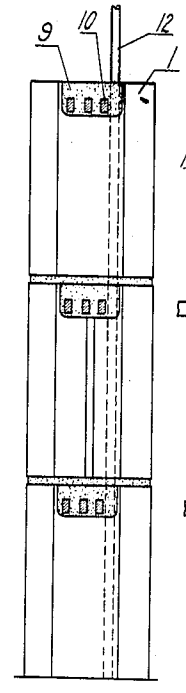


Fig. 5

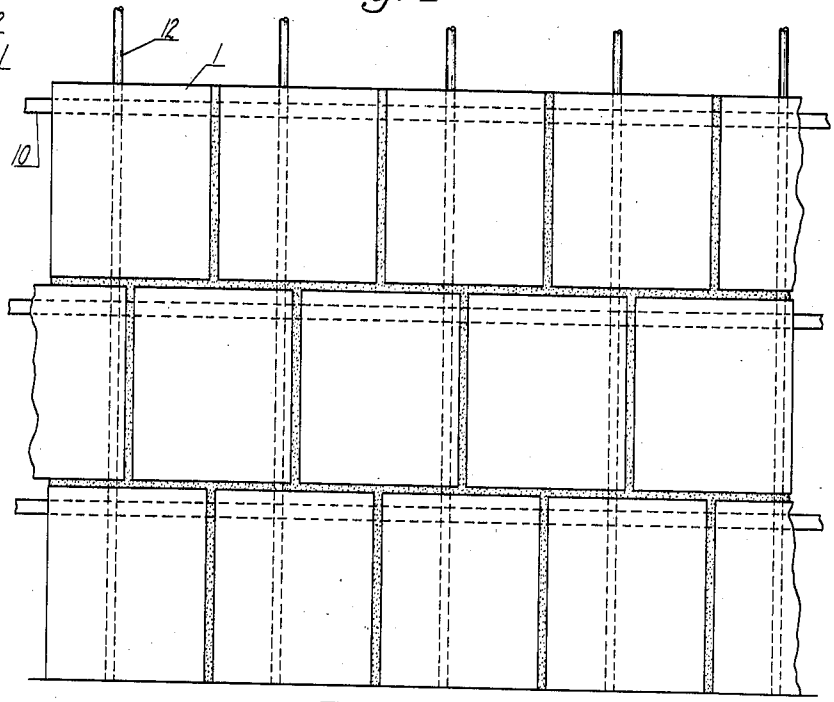


Fig. 6

INVENTOR.
Edwin F. Wanner
BY William B. Jaspert
attorney.

Aug. 10, 1943. E. F. WANNER 2,326,708

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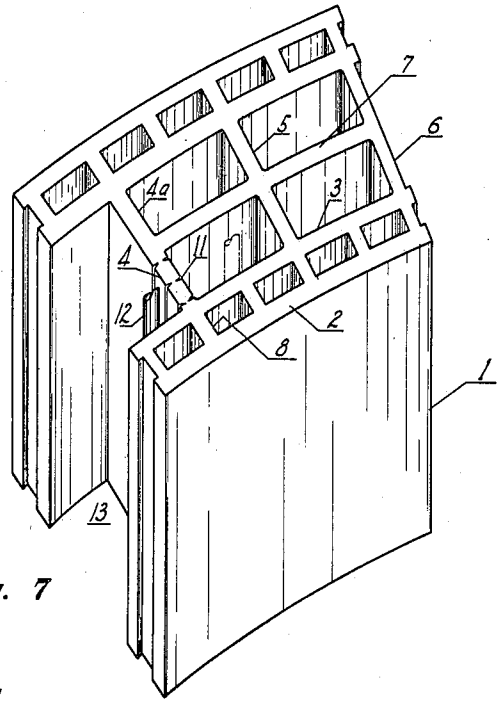


Fig. 7

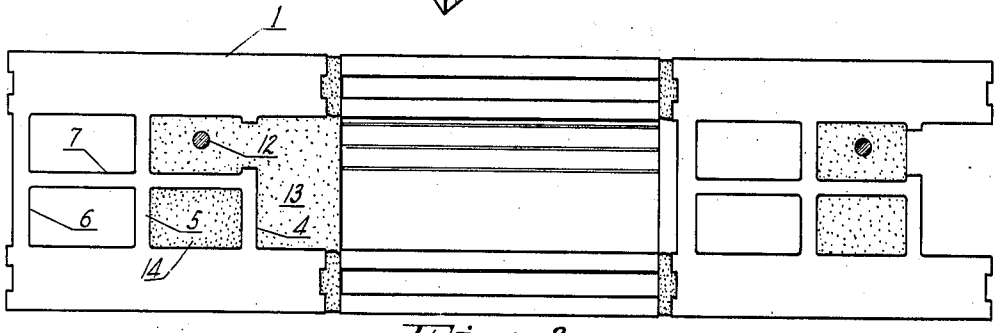


Fig. 8

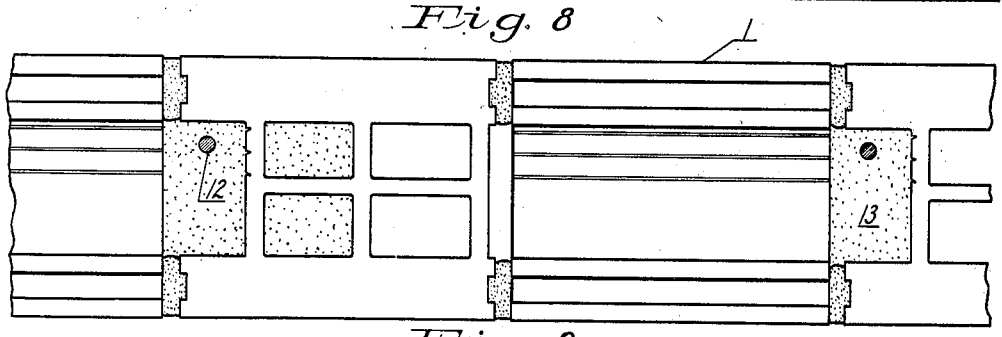


Fig. 9

INVENTOR.
Edwin F. Wanner

BY William B. Jaspert
Attorney.

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UNITED STATES PATENT OFFICE

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HOLLOW BUILDING UNIT FOR STEEL REINFORCED WALLS

Edwin F. Wanner, Pittsburgh, Pa., assignor to National Fireproofing Corporation, Pittsburgh, Pa., a corporation of Pennsylvania

Application April 17, 1940, Serial No. 330,070

3 Claims. (Cl. 72—41)

This invention relates to new and useful improvements in building units, more particularly to hollow tile, and the method of forming building walls therewith.

It is a primary object of the invention to provide hollow tile units which adapt themselves to the construction of building walls of either plain or curved shape, having reinforcing extending vertically and/or longitudinally therethrough.

A further object of the invention is the construction of a hollow tile of either single or multiple shells with a plurality of cross-webs having cut-out portions and other wall portions with lines of weakness to be fractured, whereby the tile can be adapted to accommodate reinforcing that is uniformly spaced with respect to adjacent tile units and which permits staggering the mortar joints in adjacent rows of tile, in addition to laying the tiles in direct relation one over another in the same position, producing straight vertical joints or block bond.

The units may be formed with face shells straight and parallel for walls, square, T-shaped or rectangular buildings, storage bins, containers, elevators, foundations, bulkheads or on the tangent section of any shaped structure, or with curved congruent faces for circular, oval, elliptical or other radial walls.

The invention will become more apparent from a consideration of the accompanying drawings constituting a part hereof in which like reference characters designate like parts and in which:

Fig. 1 is a view in perspective of a double-shell tile unit embodying the principles of the invention, illustrating the adaptation of the unit for vertical and horizontal reinforcing;

Fig. 2 is a top plan view of a portion of a building wall employing the unit of Fig. 1 and reinforcing elements;

Fig. 3 is a similar view of an alternate course showing the relation of the tile cells to the reinforcing material to effect a staggered mortar joint;

Fig. 4 a cross-sectional view of a double shell tile unit;

Fig. 5 an end view of a portion of a reinforced wall;

Fig. 6 a front elevational view thereof;

Fig. 7 a view in perspective of a curved segmental-shaped unit; and

Figs. 8 and 9 are top plan views of a construction in which adjacent tile and the tile in succeeding courses are laid on the normal side with the axis of the core opening, alternating from the horizontal to the vertical position, or vice versa.

With reference to the several figures of the drawings, the structure therein illustrated comprises a building tile generally designated by the reference numeral 1, having an outer face shell 2 and an inner face shell 3, opposite shells being in parallel relation with cross-webs 4, 5 and 6 and a longitudinal central web 7, there being a plurality of short cross-webs 8 between the face shell and the inner shells of the tile.

As shown in Figs. 1 and 5, the upper end of the tile has the cross-webs 4, 5 and 6 blocked out, which is done while the tile is in the green state, to form a U-shaped opening 9, Fig. 5, for receiving horizontally disposed reinforcing bars 10. Where only a small amount of horizontal reinforcing is required, it may be disposed in the mortar joint between adjacent tile, and in such cases the blocking out may be dispensed with. In some walls no horizontal reinforcing will be required.

As shown in Figs. 1 and 4, one of the end faces of the tile is not closed and forms an end channel to facilitate mounting the tile around a vertical reinforcing member. To effect staggering of the vertical mortar joints in a wall, a portion of the cross-web 4 is provided with deep notches 11 known as kerfing, to permit breaking away a portion of the web, leaving a sound portion 4a, Fig. 4. When this opening is provided, either from a kerfed unit or produced directly in the manufacturing process, the tile may be moved to embrace the vertical reinforcing rod, thus permitting horizontal spacing of the tile to produce the staggered mortar joints.

The numeral 12 designates the vertical reinforcing rods in the wall shown in Figs. 5 and 6, and in Figs. 1, 2 and 3 of the drawings.

As shown in Fig. 1, if the kerfed section of the cross-web 4 is broken out, the central cell will envelope the vertical reinforcing rod 12, but as shown in Figs. 2 and 3, alternate vertical rows have the end channels of the tile, designated by the numeral 13, oppositely disposed; that is to say, Fig. 2, shows the end channels 13 on the lefthand side, viewed from the bottom of the drawings, with the kerfed portion of web 4 broken away to bring the reinforcing rod 12 in the central web of the tile unit, and in Fig. 3 the end channels 13 are disposed in the opposite direction facing the righthand end of the wall, as viewed from the bottom of the drawings. In this way, a true vertical bond is effected with uniform distribution of the reinforcing ribs.

To provide stiffness and protection for the vertical reinforcing, all the interior cells may be filled with cement grout or concrete which will then consist of a solid reinforced concrete or grout core wall with preformed interior and exterior single or double shell protective faces.

The wall may also be constructed with spaced concrete or grout columns by filling the cells only where the vertical reinforcing occurs. This is particularly adaptable to standard un-cut units, where the cells' sides are uninterrupted so that the grout will be retained in a vertical column. Where spaced columns are desired with blocked units, or in walls utilizing the principles shown in Figs. 8 and 9, certain cells must be closed with metal or paper gaskets to retain or confine the grout protection for the vertical and/or horizontal reinforcing, as required. The spaced columns are braced laterally with the horizontal reinforcing.

By the construction herein shown, which may be employed on curved tile as well as straight tile and on single shell instead of double shell tile, metal and concrete reinforced walls may be rapidly constructed of square, rectangular, circular, oval or elliptical designs without the need of building form, and the invention adapt itself to fired clay tile or poured, extruded or compressed cinder, gravel, stone, haydite or slag concrete tile.

The tile may also be employed for separate, interior and exterior wall units joined with metal or other fastening means to construct greater width of interior cores or spaces for concrete, in which case the tile units constitute the forms for the poured materials.

Fig. 7 shows a segmental unit having the same cell construction shown in the rectangular unit of Fig. 1. It is employed in laying circular walls and vertical rods may be employed in the same manner as for straight walls. The segmental unit may be used as shown or with cross-webs **4**, **5** and **6** recessed as shown in Fig. 1, for horizontal reinforcing. In some cases additional or the entire horizontal reinforcing may be provided in bands encircling the outer surface of the wall, spaced as required to resist the design pressures.

Figs. 8 and 9 show a wall construction employing similar square-faced units laid with the cells in alternate vertical and horizontal position. The units laid in the vertical position may also be formed as shown in Fig. 1 with portions of cross-webs **4**, **5** and **6** recessed to provide for the horizontal reinforcing. The horizontal opening **9** will then be continuous since the alternate horizontal units are laid in position with channel **13** in the upright position.

Fig. 8 shows one course of tile with the reinforcing rod **12** extending vertically through the cell of the unit. Alternate units have the cells vertically and horizontally disposed, and as shown in Fig. 9, which represents an adjacent course, above course Fig. 8, the units may be staggered without interfering with the vertical rods **12**. The numeral **14** designates concrete or grouting which may be selectively placed in the vertical cells to constitute reinforcing columns. This system may also be employed for curved or circular wall construction; however the horizontal and circular units will differ with respect to the linear axis of the cell cores and two different units will be required.

It is evident from the foregoing description of the invention that tile units made in accordance therewith adapt themselves to the speedy construction of both vertically and/or horizontally reinforced wall structures, with or without concrete columns of selected areas running throughout the tile courses, the tile being especially adapted for the use of vertical reinforcing in walls with staggered mortar joints without the need of threading the tile on the reinforced rods. The vertical rods may be embedded in a concrete base and used in standard lengths with additional top rods, if required, placed in the column of mortar formed in the construction of the wall.

Although one embodiment of the invention has been herein illustrated and described, it will be evident to those skilled in the art that various modifications may be made in the details of construction without departing from the principles herein set forth.

I claim:

1. A building block comprising parallel walls having a plurality of cross-webs joined centrally by a partition extending parallel to said walls, said cross-webs being spaced to provide an open channel between the walls at one side of the block for vertical reinforcing members, and said webs and partition terminating short of one end of the block to provide a channel for horizontal reinforcing members, the web constituting the base of the side channel being kerfed between the central partition and one wall for breaking out a portion of the cross-web to provide an L-shaped internal column.

2. A building block comprising walls of double parallel shells joined by closely spaced cross-webs to provide mortar locks, said double shells having widely spaced cross-webs and a central partition dividing the space between said double shells into a plurality of vertical cells, the cross-webs and partition being cut-out at one end between the double parallel shells to form a channel in a horizontal plane, and one of said cross-webs being spaced from one side of the block to form a vertical channel with one section of said web kerfed between the central partition and one double shell wall for breaking-out said portion to provide an L-shaped internal column.

3. A building wall comprising superposed rows of blocks each comprising parallel walls having connecting cross-webs and a central partition joining said webs, said webs and partition being cut-out at one end to form a channel between the block walls, and said webs and partition terminating short of one side of the blocks to provide a vertical channel, the web constituting the base of the vertical channel being kerfed to break-out a portion thereof to provide an internal L-shaped column to permit staggering of the blocks in successive rows, horizontal reinforcing members disposed in the end channels and vertical reinforcing members disposed in said side channels, and mortar filling said columns and channels.

EDWIN F. WANNER.